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ACTIVITIES OF THE UNITED NATIONS SYSTEM: ACTIVITIES OF THE DEPARTMENT OF ECONOMIC AND SOCIAL DEVELOPMENT IN SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Report of the Meeting of High-level Experts on Science and Technology for Development

SUMMARY

The present report is submitted in accordance with the draft provisional agenda for the first session of the Commission on Science and Technology for Development, as approved by the Economic and Social Council in its resolution 1992/62. Note should be taken, however, of the fact that the Meeting of High-level Experts on Science and Technology for Development, held in Bujumbura, Burundi, from 4 to 8 May 1992, took place in the context of the activity of the Advisory Committee on Science and Technology for Development, before this body, together with the Intergovernmental Committee on Science and Technology for Development, was transformed into the new Commission on Science and Technology for Development.

It is the view of the United Nations Secretariat that this report should be considered in the evolving context that led to the transformation of the Advisory Committee and the Intergovernmental Committee into the new Commission. Hence, the Commission, while acknowledging the relevance of past experience, might wish to develop innovative approaches that extend beyond those contained in the present report.

Fourteen high-level experts and five representatives from organizations and agencies of the United Nations system participated in the Meeting of High-level Experts on Science and Technology for Development.

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The discussions reflected the conviction of the participants regarding the important role played by science and technology as a dynamic resource for sustaining social and economic development.

The substantive theme was the role of science and technology in the development of the least developed countries. The Government of Burundi prepared a case-study of the country's experiences and members of the former Advisory Committee on Science and Technology for Development subsequently visited the country to undertake a critical assessment of its science and technology system. Earlier, an ad hoc panel of experts on the subject provided an overview of key policy issues on science and technology for the least developed countries. These activities, together with the interaction that took place with the representatives of the stakeholders of Burundi, served as a basis for formulating the recommendations contained in this report.

The Meeting's participants also discussed the role of technological cooperation in fostering regional economic integration. Some private sector initiatives were also considered.

Another topic addressed was the transformation of publicly funded industrial research and development institutions. The Meeting provided some novel approaches to this issue.

Finally, the participants in the Meeting reviewed the strengths and weaknesses of the work of the former Advisory Committee on Science and Technology for Development, and made recommendations related to the functioning of the new Commission on Science and Technology for Development. This was in response to General Assembly resolution 46/235, annex, in which it was stated that, in connection with the question of funding arrangements and the modalities for the convening of ad hoc panels/workshops, the new Commission could consider the practice of the former Advisory Committee.

CONTENTS

		Paragraphs	Page
I.	SCIENCE AND TECHNOLOGY FOR THE LEAST DEVELOPED COUNTRIES	1 - 45	5
	A. Overview	1 - 2	5
	B. General prerequisites	3	5
	C. Recommendations	4 - 44	6
	1. Management of resources and building of endogenous capacities	4 - 22	6
	2. Greater emphasis on infrastructures for and linkages of technology in science and technology policy	23 - 29	8
	3. Science and technology development and technology transfer as a response to demand	30 - 39	9
	4. Generation of domestic demand for science and technology	40 - 44	10
	D. Implementation	45	11
II.	TECHNOLOGY IN INDUSTRIALIZATION	46 - 63	12
	A. Privatization of publicly funded industrial research and development institutions	46 - 48	12
	B. Role of technological cooperation in fostering regional economic integration	49 - 63	14
	1. Philosophy	49 - 56	14
	2. Areas of interest	57 - 58	16
	3. Ways and means	59 - 63	16
III.	VIEWS ON THE COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT	64 - 70	17
IV.	ORGANIZATIONAL MATTERS	71 - 76	19
	A. Opening and duration of the Meeting	71 - 74	19
	B. Election of officers	75	20
	C. Adoption of the agenda	76	20

CONTENTS (continued)

Page

Annexes

I. List of participants 22

II. List of documents 25

I. SCIENCE AND TECHNOLOGY FOR THE LEAST DEVELOPED COUNTRIES

A. Overview

1. The debate on the issue of science and technology for the least developed countries reflected the need for a new approach to policy in that area, in line with the changing global context and the new understanding of endogenous capacity in science and technology for development. This new approach should address all aspects of science and technology policy, including those of technology application, development and transfer, that had previously been neglected or underemphasized. Specific areas of weakness were addressed by the four main initiatives recommended at the national and international policy levels. It was noted that a specific strategy for building science and technology capacity and international competitiveness should be based on a case-by-case approach taking into account both the special needs and advantages of a particular country.

2. It was stressed that in the 1990s, the problems of the poorest countries had come to the forefront and needed to be urgently addressed.

B. General prerequisites

3. The Meeting of High-level Experts on Science and Technology for Development pointed to certain essential long-term prerequisites that were needed in order to secure an effective science and technology policy:

(a) There must be a minimum ongoing investment in the build-up and cultivation of human resources. As education required a long lead-time to become effective, an overall educational system must be put in place as an integral part of the cultural and societal structures;

(b) A science and technology policy for any given country would be meaningful only if it was based on a political consensus about the objectives and goals of development. Such a consensus must be reached in terms of an understanding of the relationships among social and cultural values, human capabilities and the possible utilization of existing material and intellectual resources;

(c) Owing to the broadening of marketing opportunities, and an unprecedented development of transportation, communication and information systems, entrepreneurship was evolving as a key factor in development. The educational system should favour and encourage creative thinking and the spirit of entrepreneurship. Entrepreneurship should be highly valued in society, and that could be achieved, inter alia, by giving entrepreneurs appropriate economic and fiscal incentives;

(d) In mobilizing individual creativity, the limits to be imposed by planning compared with freedom for action must be carefully balanced. Depending on the status of economic development in a given country, science and technology policy and development plans should determine the degree of government policy intervention versus the degree of freedom needed in the private sector;

(e) (Finally), any development plan should take into account the fact that success was a moving target. Therefore, a periodic reconsideration of evolving economic and other conditions was called for in order to achieve a continuous adjustment of plans and objectives.

C. Recommendations

1. Management of resources and building of endogenous capacities

4. Science and technology policy in the least developed countries needs to place greater focus on the development and utilization of locally available resources. Donor programmes or government projects that make greater use of locally available resources and endogenous capabilities, and require moderate rather than radical organizational changes, may prove to be not only less costly but also more sustainable in the long run. The building of domestic technological capabilities should become one of the priority concerns in the design of developmental programmes.

(a) At the national level

5. Science and technology education should start at an early age and be introduced in the programmes of primary- and secondary-level education. Girls should be strongly encouraged to learn about science on an equal opportunity basis with boys. The type of science education introduced should be applicable to the realities confronting the least developed countries.

6. Science and technology communities in the least developed countries tend to be small and concentrated in metropolitan areas. The mobility of science and technology personnel among research and development institutions, universities and the productive sector should therefore be encouraged in order to maximize their contribution to development. Mechanisms such as fellowships and exchange programmes or collaborative research and development projects of an interdisciplinary nature should be stimulated.

7. National education systems should endeavour to increase the number of technical schools and/or technical training programmes for the purpose of addressing the issue of the shortage of qualified support staff and middle-level science and technology personnel. Training activities should take into account needs of the private sector, through, for example, on-the-job training.

8. Incentives to enter science- and engineering-related professions should be strengthened, including through various forms of financial and professional compensation such as research grants, research contracts, or national recognition awards for research or innovation that contributes to national development. Scientists and engineers should be given a say in national policy-making.

9. To address the loss of human resources through the brain drain, incentives are needed to encourage expatriates to return home as well as qualified personnel to stay in their homeland. Such incentives can be based on an appeal to the desire to contribute to the country's development. Expatriates abroad must be considered a potential source of human resources, not necessarily

through their returning home permanently, but rather through short visits for training, lectures or consultations. Appropriate mechanisms are needed to facilitate their contribution from abroad, such as the Transfer of Knowledge through Expatriate Nationals (TOKTEN) programme of the United Nations Development Programme (UNDP). Measures should also be explored and promoted to mobilize and motivate available human resources in the country to contribute more effectively to the country's development.

10. National industrialization strategy should foster more locally based innovation and learning in the production process. More emphasis should be placed on the development aspects of research and development.

11. There should be a basic science training programme for teachers, aimed at promoting the understanding of their country's technological needs. Less emphasis should be placed on pure science, and its isolated pursuit in laboratories. There is a need to work on applications and to move from laboratories to pilot-scale operations.

12. Copying, within legal boundaries, might be an essential capacity-building activity at the first stage of development. Instead of the developing of pure basic science, there could be copying, learning, adopting and improving with respect to available technologies. Appropriate intellectual knowledge, skills and capacity should be developed.

13. Enterprises should be encouraged to promote technological innovations, for example through tax incentives for investments in science and technology.

14. Based on a thorough assessment of areas of inefficiency, there should be promotion of innovative institutions that are more responsive to the market and to local needs.

15. Recipient countries should be more actively involved in the specification of aid projects. The potential contribution of a project to the generation of local technological capabilities should be an important factor in the choice of projects.

16. Developing a set of criteria for identifying critical technologies for national development needs would be helpful in directing the development of local capacities. The availability of capabilities to decide on strategic issues and on allocation of resources is of critical importance.

17. The potential contribution of traditional knowledge systems, particularly in dealing with specific local problems, has not been fully grasped. More efforts should be devoted to understanding and documenting such knowledge.

18. To foster endogenous productive activities, it is important to change the common perception that imported products are superior to domestic ones. Other obstacles, such as the high cost of national production, must also be overcome.

(b) At the donor policy level

19. Donor projects can contribute to the development of the recipient country's endogenous capacity by maximizing the participation of local suppliers, subcontractors and technical personnel as part of programme policy.

(c) At subregional or regional levels

20. Governments should consider the possibility of collaboration on the development of a critical mass of resources and capacities at subregional or regional levels through, inter alia, the sharing of their experiences and experimental models. The pooling of resources, skills and capabilities could be an efficient way to address areas of weakness in any single country.

21. Scientific networks formed at these levels should also be focused to a greater degree on problems more specific to the region.

(d) At the international level

22. Development of appropriate human resources and institutional capacities in international cooperation programmes requires special attention.

2. Greater emphasis on infrastructures for and linkages of technology in science and technology policy

23. Technology should not be viewed merely as the application of hardware. Emphasis on infrastructural elements and technical know-how, as well as management and organization, is crucial for the sustainable and proper use of a technology. Other factors such as technical intelligence and sourcing capabilities are essential in the search for acquisition and assessment of external technologies. The commercialization or marketing of technology is necessary for its diffusion and widespread use. With this in mind, policy makers should pay more attention to the social and management aspects of technology.

(a) At the national level

24. Clear strategies should be formulated for priority objectives in industrial and agricultural development, for example. Only when such strategies are defined can technology resources be mobilized in the form of technology missions to address the developmental problems of highest-priority concern.

25. Science and technology policy should encourage the development of a technology assessment capability. The ability to access, process and analyse science and technology information is especially important in screening foreign investments in order to ensure their compatibility with and responsiveness to long-term national development goals.

26. Governments could assist firms in the financing, acquisition and application of external technologies (for example, through the setting up of a technology network for such purposes or the encouraging of alliances between domestic and foreign firms for technology information-sharing).

27. To assist technology users in the absorption process, Governments should also consider having national or regional extension services that could assist in troubleshooting or in the general process of learning a technology.

28. The commercialization of technology would be facilitated by the promotion of stronger linkages between research and development institutions, the productive sector and the market or consumer sectors.

(b) At the donor policy level

29. Donor programmes should place greater emphasis on the non-technical assets of technology choice. The transfer of hardware should be considered in the context of other factors such as the level of technical know-how required by the user or the local management, and compatibility with other local conditions.

3. Science and technology development and technology transfer as a response to demand

30. Science and technology development and technology transfer should be more demand-responsive with regard to suitability to local conditions and the sociocultural context. The adaptation of technology to local conditions will facilitate better management and maintenance of technology. The establishment of proper mechanisms should therefore be considered in order to provide a better articulation of the needs of the productive sector, particularly the agricultural sector which plays a major role in the economies of the least developed countries.

(a) At the national level

31. More effective mechanisms are needed for articulating local demand for technology and for reflecting specific national strategies, particularly with regard to the development of the private and the rural/agricultural sector.

32. Governments could also provide professional and financial incentives to encourage research and development institutions to respond to the needs of the productive sector. While the functioning of those institutions should be based on commercial principles, certain forms of government support, through contractual research, research grants and use of technical services, are needed.

33. The problem of the isolation of the science and technology communities in the least developed countries from the realities and needs of the rural areas should be addressed with strategies, mechanisms and policy incentives that encourage scientists and engineers to go into the field in order to enhance their understanding of real problems.

34. The role of science and technology policy should be considered in the course of the development of technologies in the rural/agricultural sector.

35. The application of new and emerging technologies in the rural/agricultural sector should be encouraged so as to upgrade traditional technologies. A knowledge of traditional methods is necessary for proper integration.

36. There is an urgent need for more accurate statistics in the least developed countries so as to increase the availability of data.

(b) At the donor policy level

37. Donor policy decision-making should reflect increased involvement and participation of relevant stakeholders, particularly end-users, so that a more appropriate choice of technology can be made. More local input in the design of programmes and feedback from end-users during programme implementation would facilitate local adoption of technologies. Donor programmes, especially those implemented in the traditional sectors, should be sensitive to sociocultural elements in order to allow for sustainable change.

38. The "tying" of aid restricts the flexibility of the least developed countries in making appropriate technology choices. Alternative specifications could be envisaged in project formulation so as to provide room for flexibility and choice.

39. The donor community could assist the least developed countries in gathering statistical data on science and technology resources and needs and in developing more appropriate science and technology indicators.

4. Generation of domestic demand for science and technology

40. Methods of generating domestic demand for science and technology include increasing public awareness of the role of science and technology and supporting potential users of science and technology in the private sector, especially small- and medium-sized enterprises and non-governmental organizations.

(a) At the national level

41. Governments, with the help of local scientists and engineers, could organize radio programmes and extension services to popularize science and technology.

42. The private sector can be a vibrant source of technology demand. Private sector activities would be facilitated by creation of appropriate legal frameworks, reduction of bureaucratic procedures, facilitation of access to market information, export promotion and supply of basic infrastructures to facilitate storage, transportation and distribution of products. Promotion of small enterprises should be part of a science and technology policy. Tax incentives, extension of credit and assistance in finding financial sources for local investment would encourage entrepreneurial activities.

43. Short-term courses in business/technology management and marketing could be provided to improve management capabilities. Mechanisms such as technology incubators, technology venture capital funds and business support systems can also foster private sector demand for technology.

44. Government support for the private sector should also be extended to non-governmental organizations. Such organizations are actively involved in productive activities in the rural sector and in need of support.

D. Implementation

45. The following guidelines are proposed for consideration by entrepreneurs and policy makers at the political level:

(a) Before proceeding with any development plan, a common understanding on its objectives should be achieved among all stakeholders involved;

(b) The scope of a development plan encompasses a variety of functions, resources and activities, with complex linkages and interactions. It is advisable to begin with an overview of all parties potentially involved in research and development, market research, system and product development, production, marketing and infrastructural functions and services, including governmental and legal provisions;

(c) Having identified the range of functions to be included in a plan, lead-times should be determined and respective measures conceived to activate the plans within a given time-frame. Potential obstacles should also be assessed;

(d) The activation process should include, inter alia, an assessment of those parts of a programme that can be covered by endogenous capabilities and efforts versus those functions that can be secured only from external sources;

(e) In assessing the functions of a development programme, the question of critical mass must be addressed. Critical mass depends not only on the span and volume of capabilities needed, but also on the envisaged time-frame. It can be reached through mobilization of existing resources, redirection and coordination of scattered but adjustable functions, cooperative arrangements on country-wide or regional levels, and training and education programmes;

(f) Having assessed all these factors, the implementation of a development plan can be carried out under a programme management-type function. The latter entails determination of principles and rules, estimates of total costs, design of financial plans, interfunctional management and linkage, and information systems;

(g) Within the range of functions of a development programme, a steering and control mechanism should be established for management control, review and approval of the various programme phases. Such a mechanism should also focus on the aspect of moving targets, thereby establishing a relationship between a development programme and a given time-frame;

(h) (Finally), the success of any programme depends heavily on motivation and a persistent will to achieve high-quality performance. The leadership function presupposes a continuous focus on these goals.

II. TECHNOLOGY IN INDUSTRIALIZATION

A. Privatization of publicly funded industrial research and development institutions

46. Publicly funded industrial research and development institutions exist in many countries. They constitute important components of each country's national system of innovation. In recent years, many Governments have followed policies designed to encourage market mechanisms and privatization. This trend has had repercussions on public industrial institutes which have been encouraged to become more market-oriented and to diversify their funding sources.

47. A number of international organizations, including the United Nations Industrial Development Organization (UNIDO) and the World Bank, are studying the transformations in the organization and management of public industrial institutes with the objective of becoming enabled to advise developing countries on this subject. Those organizations have indicated that they would welcome the advice of the expert group on the issue.

48. The following points summarize the ideas of the expert group on the subject of privatization:

(a) Privatization in this context does not necessarily mean transfer of the property of these institutions to the private sector. Rather, it means that their activities should become more demand-oriented and that the recipients of the services should pay a measure of the costs;

(b) The issue is particularly important for developing countries which could benefit from the experience acquired by the developed countries in the process of privatization;

(c) The active participation of private industries does not necessarily mean a reduction in the public funds allocated to research and development. Rather, the objective is the following: that the public and private funds spent in publicly funded industrial laboratories become more effective in promoting industrial development;

(d) The transformation of publicly funded laboratories would offer an opportunity to bring industrial research and services closer to the needs of users;

(e) Policies to guide the privatization process should be country-specific and, in general, oriented towards enabling industrial research to approach a customer-supported condition. Governments should continue to support research activities that are not commercially viable but are still considered essential for infrastructure and long-term development;

(f) The basic notion to be kept in mind in conducting the privatization process is that in all countries the Government has a role in promoting and financing research, even if a well-established market economy is predominant;

(g) There are several types of research that Governments must support: basic research; applied research that is carried out in the public interest and

not likely to become commercially exploitable; and research, connected with certain strategic research programmes, whose commercial value lies beyond the economic horizon of industry;

(h) Since small enterprises as a whole employ most of the industrial workforce in every country, industrial laboratories should design their policies so that those enterprises can benefit from their services; this might require, inter alia, the involvement of laboratories in those services such as extension, training, testing, information and normalization that small industry cannot organize by itself. Governments should promote networking among small enterprises;

(i) Public funds may be used to subsidize the costs of industrial research in the form of grants, and reimbursable grants and loans. Projects and services rather than institutions should be supported. Another promotion method involves subsidizing interest rates on loans;

(j) Due attention should be paid to the product development and marketing phase which could use some form of public support through, for example, product development loans, venture capital facilities and special public procurement. For this purpose, Governments should initiate and promote the mobilization of resources from local, regional and international banks;

(k) Another method of channelling public funds to finance private technology projects involves a tax deduction for the enterprises that commission research projects to industrial laboratories;

(l) In order to increase the chances of success of the privatization process industrial research institutions should be headed by experienced managers; in any case, the various stakeholders should be represented on the governing boards of those institutions;

(m) In small countries belonging to a homogeneous economic region, industrial laboratories and services could be best organized and sustained if conceived as regional institutions;

(n) In the case of the least developed and some other developing countries, policies should be designed to encourage multinational corporations to subcontract part of their research to local industrial laboratories;

(o) Every country should promote the understanding of local technological needs and design policies to stimulate the demand for the development of appropriate technologies.

B. Role of technological cooperation in fostering regional economic integration

1. Philosophy

49. The participants emphasized the role of new technologies in the process of regional economic integration and in the globalization of the world economy. The proliferation of transport and communications technologies has brought countries closer together and increased the opportunities to share and accept new concepts and ideas that can contribute to a better quality of life for people in developing countries.

50. Technological leadership has, in a way, forced the advent of such integration as a means for improving quality of life through a demonstrated sharing of benefits in all areas that affect people's lives.

51. As a rule, regions that have achieved an appreciable measure of integration have been able to benefit from the existence of a good technological base, a substantial industrial infrastructure and a local market where private and public sectors have collaborated closely. Integration has helped to further encourage economies of scale. For some developing countries, the development of endogenous capacity to meet basic local needs will be the prerequisite to achieve the conditions, including political ones, needed for participating in regional economic integration. Mass participation in decision-making through a process of democratization is necessary to enable sustained development, application of science and technology and, through this, industrial economic development. In the above-mentioned context, the objectives of regional technological integration should be:

(a) To create a climate conducive to dialogue between companies and research institutions;

(b) To establish joint ventures among companies and research institutions from two or more countries;

(c) To develop new products, processes and services, and to improve the quality of existing ones, in order to expand market share;

(d) To achieve homogeneous international standards of quality;

(e) To enhance the productive capacity existing in each country;

(f) To improve the quality of life.

(a) Factors that favour regional economic integration

52. The contribution of technology to the strengthening of regional economic integration can be significant only if certain preconditions are met. These are:

(a) The possibility of extending the economies of scale in production or reaching a critical mass of resources;

(b) The motivation of those interested in pooling resources to achieve common goals, and the willingness of entrepreneurs to undertake joint ventures, and of researchers to undertake joint and collaborative projects;

(c) The existence of organized databases to enable easy access to scientific, technological and economic information;

(d) Suitable communications, including transportation facilities;

(e) The political will of leadership backed by a commitment to pursue economic integration in spite of preliminary difficulties of various kinds;

(f) The existence of a legal framework that can favour the development, manufacture and marketing of goods, and the free flow of goods and services across boundaries. This may include harmonization of fiscal and other incentives.

53. With regard to all the above factors, Governments should act as catalyzers to facilitate the establishment of initial funds for joint technological projects. The private sector will thus be encouraged to pursue the process leading towards the achievement of the desired level of economic integration.

(b) Economic integration in developing countries

54. In the past two decades, many developing countries have made attempts to achieve a certain measure of economic integration in their own regions and subregions through technological cooperation. In many cases, internal political instability and cross-border political strife have hindered such integration.

55. A recently launched example of regional integration in Latin America is the Bolivar Programme: an initiative to foster cooperation among companies, research centres and public and private institutions in the creation of a new system of relationships among the various scientific, technical and industrial sectors. These new alliances, based on the dynamics of the private sector and the promotional role of the State, are intended to contribute to the development of productive capability in Latin America and the Caribbean, thereby improving the competitiveness of the region's goods and services in international markets.

56. In the African region, economic groupings in the subregions have been established, and the Intergovernmental Committee of Experts for Science and Technology for Development in Africa and its subregional working groups are contributing to the process of economic integration. Also, the African Economic Community is being established, with a protocol on science and technology, with the support of the Organization of African Unity (OAU) and the Economic Commission for Africa (ECA). In the Asian region, the Association of South-East Asian Nations (ASEAN) programme has been successful in utilizing science and technology as a means to achieve economic integration. In the area of infrastructure, the ASEAN programme has already established subregional electrical grids and, in the area of human resource development, common training facilities.

2. Areas of interest

57. The expert group identified the specific technologies that appear to have the highest potential for contributing significantly to the integration and industrialization process in developing countries, regardless of their level of development.

58. The following technologies or topics are listed in the order of their potential contribution to the integration process:

(a) Information, communication and transportation facilities;

(b) Biotechnology, with its potential to solve the food problems in developing countries;

(c) Energy technologies, with emphasis on the environment, cooperation and industrial development in developing countries;

(d) New technologies: their effect on development and on regional economic integration;

(e) The role of private industry in socio-economic development in general and in technological integration in particular.

3. Ways and means

59. Integration through technology should be a step-by-step process, through a trickle-down or trickle-up approach, or a mix of the two. However, the trickle-up approach is recommended as more sustainable.

60. For example, the ASEAN programme of integration through technology includes the following steps:

(a) Free movement of people through tourism;

(b) Establishment of common training facilities;

(c) Establishment of common financial infrastructures such as the Asian Finance Investment Corporation;

(d) Use of common infrastructure for advanced science and technology.

61. Another method for achieving smooth integration through technology is via harmonized technical specifications and standards. Using common standards promotes increased cooperation among the countries involved and also leads to sharing expertise in subsequent technological choice, maintenance, repair, training, research and application through production.

62. A third method is to use public incentives to stimulate private initiatives. Those incentives can be financial or institutional and they should also be included in the legal framework.

63. The three methods mentioned above are not mutually exclusive but, rather, complementary. Programmes leading to regional integration should be extended to include participation of other regions, wherever possible.

III. VIEWS ON THE COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

64. The expert group, consisting of 14 members of the former Advisory Committee on Science and Technology for Development, welcomed the opportunity to carry out a review of the past experiences of the Advisory Committee as the basis for determining its views on the activity of the new Commission on Science and Technology for Development. A need for change was recognized. In recent years, the Intergovernmental Committee on Science and Technology for Development, as well as the Advisory Committee, appeared to have had insufficient impact.

65. The Advisory Committee had contributed through its reports to the Intergovernmental Committee. Those reports attempted to clarify issues and to recommend practical guidelines for action. It was understood that a number of the reports, especially those addressing the issues of endogenous capacity-building, innovation and sustainable development, were well regarded by international agencies and national Governments.

66. The Commission on Science and Technology for Development should note the general positive characteristics of the work of the Advisory Committee, including, in particular:

(a) Composition of the Advisory Committee: Its representative mix of highly competent stakeholders concerned with science, technology and development had had a positive bearing on the topics discussed;

(b) Size of the Advisory Committee: The Advisory Committee had consisted of 28 members, with an average of 22 attending the meetings. This had been a number large enough to ensure adequate professional and geographical representation and small enough to enable constructive debate and active participation of all members;

(c) Style of work: At its annual meetings, a roughly equal amount of time had been spent in small working groups and in plenary sessions. This had proved to be a productive way of conducting the Advisory Committee's business;

(d) Frequency of meetings: Besides annual meetings of the full Advisory Committee, opportunities had been provided for selected Advisory Committee members to participate in panels and task forces which met more frequently to consider specific topics. The good communication and trust that had been achieved between members was instrumental in enabling them to reach a consensus on difficult issues;

(e) Location of meetings: Whenever possible, meetings had been held in developing countries. This had contributed to the relevance and continuity of the discussions and to the full commitment of the members, including opportunity for extensive interaction between the Advisory Committee and government officials and local scientists of the host countries;

(f) Secretariat support: This was provided by the Advisory Committee secretary and other staff of the former Centre for Science and Technology for Development of the United Nations Secretariat. The quality of support had been an important factor in the success of the meetings and in the provision of continuity between meetings.

67. The former Advisory Committee's weaknesses, which the Commission should recognize, included:

(a) The limited amount of time that most Advisory Committee members could devote to the work of the Advisory Committee: Very few members had been able to respond to requests for advice from either the Advisory Committee's Chairman or its secretariat between sessions;

(b) The lack of first-hand contact and dialogue with representatives of agencies of the United Nations system: It had been only in the last 18 months of the Advisory Committee's existence that efforts were made to make the potential benefits of the Advisory Committee better known to those parts of the United Nations actually involved in applying science and technology to development. During that time, good contacts had developed with UNDP, UNIDO and the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the possibility of further interaction with other principal United Nations bodies was becoming more apparent;

(c) The lack of interaction between the Intergovernmental Committee on Science and Technology for Development and the Advisory Committee: There had been very little feedback from the Intergovernmental Committee on Advisory Committee reports.

68. The principal problem, however, appears to have been the lack of a well-defined role for the Intergovernmental Committee within the United Nations system. The members of the Advisory Committee had not been sufficiently familiar with the work of the Intergovernmental Committee to explain its failure, but expressed the hope that the Commission would be accorded a clear and specific task.

69. The views of the expert group are summarized as follows:

(a) A clear mandate should be established for the Commission identifying its relationship with the Economic and Social Council and the General Assembly, and ensuring that it receives regular feedback on its recommendations and observations;

(b) A Bureau of the Commission, with appropriate regional representation, should be empowered to take action on behalf of the Commission between its sessions. The Bureau could meet at least semi-annually;

(c) The Commission should be serviced by a strong secretariat.

70. It is recommended that the Commission, in order to perform its envisaged role, should take into account the following, namely, that its secretariat:

(a) Should not be involved in servicing operational projects in developing countries;

(b) Could be strengthened by short-term secondment of high-calibre staff from national Governments and the private sector;

(c) Should be assisted in its work by advisory panels consisting of experts appointed by the Secretary-General of the United Nations. These panels would incorporate the best features of the former Advisory Committee and be encouraged and empowered to provide advice to all the relevant operational agencies of the United Nations system;

(d) Should be responsible for preparing background papers on topics requested by the Commission or the advisory panels;

(e) Could also play a substantial role in disseminating the views of its advisory panels and of the Commission;

(f) Should be a focal point for information about all of the activities of the United Nations system that relate to science and technology for development. This would imply both the collection of information and its dissemination.

IV. ORGANIZATIONAL MATTERS

A. Opening and duration of the Meeting

71. The Meeting of High-level Experts on Science and Technology for Development was held in Bujumbura, Burundi, from 4 to 8 May 1992.

72. The Prime Minister of Burundi welcomed the participants and thanked the experts for having chosen Burundi for their meeting. He said that the Meeting was taking place while the country underwent a process of democratization. The Government of Burundi was particularly committed to science and technology. The objective of research in Burundi was to solve urgent social problems including the need to increase the production of food and energy in order to alleviate health and environmental problems. He pointed out that despite political will, research in Burundi still faced many problems such as insufficient human, material and financial resources. The country still lacked a clear science and technology policy and adequate mechanisms to implement it. He concluded by expressing his hope that the Meeting would formulate clear and efficient strategies that could be helpful to those people who had not yet benefited from science and technology.

73. In his opening statement, the Chief of the Science and Technology Branch of the Science, Technology, Energy, Environment and Natural Resources Division of the Department of Economic and Social Development of the United Nations Secretariat thanked the Government of Burundi for hosting the meeting and for providing efficient support. Referring to the restructuring of the United Nations, in particular to the creation of a Commission on Science and Technology for Development, he requested the advice of the expert group on the future role of the new Commission. He also expressed his appreciation for the valuable contribution made by the former members of the Advisory Committee on Science and

Technology for Development and especially by its former Chairman. With respect to the issue of the least developed countries, he expressed the feeling that one advantage possessed by such countries, as latecomers to the development process, was the possibility of their avoiding certain mistakes made by developed countries in the past. Regarding the substantive theme for 1993, he invited the group to consider a vision of regional economic integration on the one hand, and the potential of the new technologies for industrialization of the developing countries on the other. Finally, he expressed the hope that in the new climate of cooperation within the international community and particularly within the United Nations, it would be possible to provide the assistance needed by the South in strengthening scientific and technological capacities.

74. The Chairman of the former Advisory Committee expressed his sincere gratitude for the warm welcome extended by the host country. The Advisory Committee over the past few years had addressed important issues, and was aware that while advances in scientific research resulted in contributions to development, the application and the diffusion of technology played equally significant roles. With respect to each of the issues related to science and technology dealt with by the Advisory Committee, an analysis had been made, recommendations for Governments developed, and practical steps for the international community suggested. He referred to various preparations made for this meeting, including case-studies, the mission of a small Advisory Committee team and a review of international literature on the subject. The small size of the scientific and technological community of the least developed countries made them vulnerable in many respects, and lacking in resilience with respect to shocks. The question before the expert group was how to draw on science and technology for the purpose of tackling the problem of vulnerability. The Chairman hoped that the expert group could make a small contribution in that regard.

B. Election of officers

75. The following officers were elected at the Meeting of High-level Experts on Science and Technology for Development:

Chairman: Geoffrey Oldham

Vice-Chairmen: Dulce Arnao de Uzcategui
Donatien Bihute
Elizabeth Birman

Rapporteur: Meneleo J. Carlos, Jr.

C. Adoption of the agenda

76. The Meeting of High-level Experts adopted an agenda that read as follows:

1. Adoption of the agenda and organization of work.

2. Election of officers.

3. Science and technology for the least developed countries.

4. Role of technology in industrialization and regional economic integration.

5. Transformation of the Intergovernmental Committee on Science and Technology for Development and the Advisory Committee on Science and Technology for Development into the Commission on Science and Technology for Development.

6. Consideration and adoption of the report.

Annex I

LIST OF PARTICIPANTS

Dulce Arnao de Uzcategui
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President
Consejo Nacional de Investigaciones
Cientificas y Tecnologicas (CONICIT)
Venezuela

Donatien Bihute
Chairman
Meridien Bank of Burundi
Burundi

Elisabeth Birman
Vice-President/Managing Director
INNOFINANCE
Hungary

Niels E. Busch
Managing Director
Danish Technological Institute
Denmark

Robert Gyabaa Jones Butler
Director-General
Council for Scientific and
Industrial Research
Ghana

Meneleo J. Carlos, Jr.
President
Resins Incorporated
Philippines

Karl Ganzhorn
Germany

Joséphine Guidy Wandja
Docteur d'etat en sciences mathématiques
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Tosca Hernandez
Director, International Cooperation
CONICIT
Venezuela

Ladislav Kovàc
Ambassador Extraordinary and
Permanent Representative
Permanent Mission of Czechoslovakia
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Vladimir Labunov
Director of Microelectronics
Radio Engineering Institute
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Daniel Reséndiz Nuñez
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V. Kotchetkov
Chief, Science and Technology
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Annex II

LIST OF DOCUMENTS

Document number	Title or description
ST/BURUNDI/1	Provisional agenda
ST/BURUNDI/2	Organization of work
ST/BURUNDI/3	Report of the Panel on Science and Technology for Least Developed Countries and Other Small Developing Countries
ST/BURUNDI/4	Case-study on Burundi: Promotion of science and technology and endogenous scientific and technological capacities in Burundi
ST/BURUNDI/5	Report of the Advisory Committee on Science and Technology for Development review team on the assessment of science and technology in Burundi
ST/BURUNDI/6	Note on technology in industrialization and regional economic integration
ST/BURUNDI/6A	Innovation and development
ST/BURUNDI/6B	Outline of report on technology and industrialization
ST/BURUNDI/6C	Role of innovation for development
ST/BURUNDI/7	Relevant sections of the draft Agenda 21
ST/BURUNDI/8	Overview of the 10 years' work of the Advisory Committee for Science and Technology for Development
ST/BURUNDI/9	Note on the Commission on Science and Technology for Development

Additional document

Latin American Commission on Science and Technology (CONICIT) (1992). Bolivar Programme: Regional Technological Integration and Industrial Innovation and Competitiveness. Caracas: CONICIT.